FORM PTO-1390 (REV 12-2001) U S DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE

TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371

ATTORNEY'S DOCKET NUMBER: DN1999227USA

U S APPLICATION NO. (If known, see 37 CFR 1 5): 10/070983

INTERNATIONAL APPLICATION NO.	INTERNATIONAL FILING DATE	PRIORITY DATE CLAIMED
PCT/US99/24649	October 20, 1999	

TITLE OF INVENTION
CUFFED HOSE AND METHOD OF MANUFACTURE

APPLICANT(S) FOR DO/EO/US
Andre Georges Cook et al

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. [X] This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. [ ] This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. [ ] This is an express request to begin national examination procedures (35 U.S.C. 371(f)). The submission must include items (5), (6), (9) and (21) indicated below.
4. [X] The US has been elected by the expiration of 19 months from the priority date (Article 31).
5. [X] A copy of the International Application as filed (35 U.S.C. 371(c)(2))
   a. [ ] is attached hereto (required only if not communicated by the International Bureau).
   b. [ ] has been communicated by the International Bureau.
   c. [X] is not required, as the application was filed in the United States Receiving Office (RO/US).
6. [ ] An English language translation of the International Application as filed (35 U.S.C. 371(c)(2)).
   a. [ ] is attached hereto.
   b. [ ] has been previously submitted under 35 U.S.C. 154(d)(4).
7. [X] Amendments to the claims of the International Aplication under PCT Article 19 (35 U.S.C. 371(c)(3))
   a. [ ] are attached hereto (required only if not communicated by the International Bureau).
   b. [ ] have been communicated by the International Bureau.
   c. [ ] have not been made; however, the time limit for making such amendments has NOT expired.
   d. [X] have not been made and will not be made.
8. [ ] An English language translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371 (c)(3)).
9. [X] An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).
10. [ ] An English lanugage translation of the annexes of the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

Items 11 to 20 below concern document(s) or information included:

11. [X] An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
12. [ ] An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
13. [ ] A FIRST preliminary amendment.
14. [ ] A SECOND or SUBSEQUENT preliminary amendment.
15. [ ] A substitute specification.
16. [ ] A change of power of attorney and/or address letter.
17. [ ] A computer-readable form of the sequence listing in accordance with PCT Rule 13ter.2 and 35 U.S.C. 1.821 - 1.825.
18. [ ] A second copy of the published international application under 35 U.S.C. 154(d)(4).
19. [ ] A second copy of the English language translation of the international application under 35 U.S.C. 154(d)(4).
20. [X] Other items or information:
    International Search Report

U.S. APPLICATION NO (if known, see 37 CFR 1.5)	INTERNATIONAL APPLICATION NO	ATTORNEY'S DOCKET NUMBER
10/070983	PCT/US99/24649	DN1999227USA

21. ☒ The following fees are submitted:	CALCULATIONS PTO USE ONLY	
BASIC NATIONAL FEE (37 CFR 1.492 (a) (1) - (5)):		
Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO **$1040.00**		
International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO **$890.00**		
International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO **$740.00**		
International preliminary examination fee (37 CFR 1.482) paid to USPTO but all claims did not satisfy provisions of PCT Article 33(1)-(4) **$710.00**		
International preliminary examination fee (37 CFR 1.482) paid to USPTO and all claims satisfied provisions of PCT Article 33(1)-(4) **$100.00**		
ENTER APPROPRIATE BASIC FEE AMOUNT =	$ 890.00	
Surcharge of **$130.00** for furnishing the oath or declaration later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492(e)).	$	

CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE		
Total claims	15 - 20 =	0	x **$18.00**	$	
Independent claims	3 - 3 =	0	x **$84.00**	$	
MULTIPLE DEPENDENT CLAIM(S) (if applicable)			+ **$280.00**	$	
TOTAL OF ABOVE CALCULATIONS =				$	
☐ Applicant claims small entity status. See 37 CFR 1.27. The fees indicated above are reduced by 1/2.			+	$	
SUBTOTAL =				$	
Processing fee of **$130.00** for furnishing the English translation later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492(f)).				$	
TOTAL NATIONAL FEE =				$	
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). **$40.00** per property +				$	
TOTAL FEES ENCLOSED =				$ 890.00	
				Amount to be refunded:	$
				charged:	$

a. ☐ A check in the amount of $ _____ to cover the above fees is enclosed.

b. ☒ Please charge my Deposit Account No. 07-1725 in the amount of $ 890.00 to cover the above fees. A duplicate copy of this sheet is enclosed.

c. ☒ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 07-1725 . A duplicate copy of this sheet is enclosed.

d. ☐ Fees are to be charged to a credit card. **WARNING:** Information on this form may become public. **Credit card information should not be included on this form.** Provide credit card information and authorization on PTO-2038.

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137 (a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:

SIGNATURE

Nancy T Krawczyk
NAME

38,744
REGISTRATION NUMBER

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The Goodyear Tire & Rubber Company

Akron, Ohio 44316-0001

PATENT AND TRADEMARK DEPARTMENT
66-457 OR 64-0550

March 8, 2002

CABLE ADDRESS "GOODYEAR"AKRON" U S A - TELEX

OUR REF: DN1999227USA

VIA U.S. EXPRESS MAIL EL014690209US

Assistant Commissioner
for Patents
Washington, DC 20231

Re: **International Patent Application No PCT/US99/24649**

Dear Sirs:

Enclosed herewith is the necessary documentation for entering the National Phase for the subject patent application.

The national phase will begin on or about **April 20, 2002**.

Sincerely,

Nancy T Krawczyk, Patent Attorney
Reg. No. 38,744

NTK:klh

Encls: Transmittal Letter Under 35 U.S.C. §371
Declaration and Power of Attorney
International Search Report (*w/references*)
Information Disclosure Statement (*Form PTO-1449*)
International Preliminary Examination Report

STREET ADDRESS: 1144 EAST MARKET STREET
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CUFFED HOSE AND METHOD OF MANUFACTURE

Technical Field

The present invention relates to composite hoses, more particularly to rubber and plastic hoses comprising an outer helically extending reinforcement layer. The hose is constructed to provide for easier coupling of the hose ends and any desired fittings.

Background Art

Hoses manufactured with outer helical PVC, nylon, or other plastic-like polymer rod reinforcements are known in the art. Such hoses are also known as drop hoses. Drop hoses are mainly used for the transfer of various fluids, such as gasoline, petroleum based products, chemicals, food products, etc., in tank truck applications. Drop hoses, and similar corrugated hoses, are made by several different manufacturing methods, including those disclosed by US Patents 4,383,555, 4,471,813, 4,304,266, 4,012,272, and 3,938,929 and disclosed in WO97/24543. The hose ends are generally later coupled with cam and groove fittings and band clamps.

Because of the need for a tight fit between a fitting and the hose, the outside diameter of a fitting shank and the inside diameter of the hose are almost identical; the shank is usually a bit larger than the hose ID. The slightly larger shank OD results in deformation of those portions of the hose that are in contact with the shank. Thus a certain force is required to insert the fitting shank into the hose. The force required to insert the shank into the hose increases if the hose is reinforced with a rigid, non-deformable material such as the outer helical PVC rod. To provide the necessary force or to reduce the required force, it is known in the art to apply lubricants to hose, to attempt to soft the PVC prior to insertion in the hose, or apply greater force to the fitting to ensure a proper insertion. All of these methods are time and labor consuming and may be detrimental to the hose or the fitting.

The configuration of the outer corrugations can also make the insertion of the fittings into the hose bore difficult and make it difficult to install the band clamps over the plastic spiral wire and achieve a leak proof connection without band distortion and damage to the hose or fitting. Over the years, aids have been developed to overcome these situations. One such aid is to place a piece of rope between the outer corrugations of the cover to achieve a flat surface at each end of the hose that will make it easier to install the band clamps and prevent distortion. Another aid is the use of a "banding coil." A banding coil is a separate spring or coil made out of a plastic-like material that is either screwed or wrapped on the cover and fills the corrugations created by the outer helical wire at each end of the hose. The result achieved by the banding coil is the same as the rope, which is to end up with a flatter surface to install the band clamps. Another

aid is the use of a rubber-like sleeve that is slipped over the ends of the hose that also attempts to create a flatter surface.

The present invention of forming a drop hose with soft cuffed ends eliminates the known problem in the art and eliminates the use of external aids as described above in coupling this type of hose. Many other advantages also arise from the present invention, including easier insertion of the fitting into the hose, reduced labor in coupling the hose, better coupling retention, and a likely reduction of necessary inventory for hose distributors.

Corrugated rubber or plastic hose with cuffed ends are disclosed in the following patents. US 4,099,744 discloses a hose end formed flat with no corrugations. US 5,398,977, US 5,497,810, and EP 330894 disclose a plastic cuff inserted over the corrugations. US 3,640,312, discloses an extruded hose end formed without corrugations and US 4,456,034, US 4,996,741, US 4,996,20, US 4,295,496, and US 4,669,508 all disclose extruded or rubber corrugated hoses with non-corrugated ends which are internally reinforced by helically extending wires placed within the extruded or preformed corrugations. However, the corrugations of these hoses are formed by the extruded layers or by internal helical means, differing from the external helical reinforcing means of the conventional drop hoses. It is the presence of the external helical reinforcing means of the drop hoses which has created the need for the external aids and high force required to apply fittings to the drop hoses.

However, in the drop hose of the present invention, the corrugations are solely formed by the helically extending outer reinforcement, and the base hose material has a constant internal diameter. While forming cuffs on hose ends is known in the art and the need for a constant outer diameter at the end of drop hoses to provide the hose with fittings has long been recognized in the art, as evidenced by the numerous types of aids used with conventional drop hose ends, forming a drop hose with cuffed ends in the manner of the present invention has not been appreciated or recognized. The present invention is directed toward a solution of a long felt problem in the art and provides the many benefits listed above.

Summary of the Invention

The present invention is directed towards an improved flexible hose. The hose is comprised of at least a flexible material and a reinforcing rod positioned externally of the flexible material. Terminal ends define both the flexible material and the reinforcing rod. At least one terminal end of the reinforcing rod is located short of the terminal ends of the flexible material, so that the non-reinforced end of the flexible material forms a soft cuff adapted to be received by a hose fitting.

Also disclosed is an improved method of manufacturing the flexible hose of the present

invention. The hose is formed by rotating a mandrel while feeding a length of material onto the mandrel to build a hose length on the mandrel, feeding a second length of material in the form of a reinforcing rod onto the mandrel to form a helical reinforcing rod on the hose length and curing the hose length. The improvement in the method of forming the inventive hose is characterized by, prior to feeding the reinforcing rod onto the mandrel, modifying the hose length to create non-adhesive regions.

Another aspect of manufacturing the inventive hose includes applying a third material to the hose length to create the non-adhesive regions.

Another aspect of manufacturing the inventive hose lies in the method of applying the reinforcing rod onto the mandrel in the locations of the non-adhesive region. The speed at which the mandrel rotates as the reinforcing rod is feed onto the mandrel at the non-adhesive regions may be reduced, creating a winding with a greater pitch in the non-adhesive regions. Or the tension of the reinforcing rod may be reduced as the reinforcing rod is feed onto the mandrel at the non-adhesive regions.

Also disclosed is a hose length. The hose length is comprised of at least one elastomeric layer and a reinforcing rod helically wound externally of the elastomeric layer. Periodically spaced along the hose length are non-adhesive regions.

Another aspect of the disclosed hose length is that the reinforcing rod is not adhered to the elastomeric layer in the non-adhesive region.

Another aspect of disclosed hose length lies in the application of the reinforcing rod on the elastomeric layer in the locations of the non-adhesive region. The reinforcing rod may be wound onto the elastomeric layer with a reduced pitch than in the adhesive regions. Or the tension of the reinforcing rod may be reduced in the non-adhesive regions.

Brief Description of Drawings

The invention will be described by way of example and with reference to the accompanying drawings in which:

FIG. 1 illustrates the inventive hose;

FIG. 2 is a cross-sectional view of the hose;

FIG. 3 illustrates the method of manufacturing the inventive hose;

FIG. 4 illustrates a portion of the hose during manufacture.

Detailed Description of the Invention

The hose 10 of the present invention is illustrated in FIG 1. The hose 10 has an external reinforcing rod 12 helically wound about a flexible hose base 14. The reinforcing rod 12 has a terminal end 16 located a distance from the terminal end 18 of the hose base 14, creating a soft

hose cuff 20. The hose 10 has a constant internal diameter (see FIG 2), and a minimum and maximum outer diameter created by the corrugation effect of the reinforcing rod 12 and the flexible hose base 14 between the windings of the reinforcing rod 12. Since the soft cuff 20 is an extension of the flexible hose base 14, the cuff 20 has an outer diameter corresponding to the minimum outer diameter of the hose 10.

An exemplary construction of the hose 10 is illustrated in the cross-sectional view of FIG 2. The flexible hose base 14 is constructed from a base layer 22, two reinforcing plies 24, 26 and an outer cover layer 28. The hose base 14 may be provided with a number of layers differing from the illustrated two reinforcing layers 24, 26 and other rubber layers in addition to the base layer 22. The number and type of layers comprising the flexible hose base 14 is dependant upon the desired hose properties as determined by the end use of the hose 10.

The base layer 22 is constructed of conventional natural or synthetic thermoelastic vulcanizable material used in the manufacture of hoses. The reinforcing layers 24, 26 are also formed of conventional hose reinforcing materials. The cover layer 28 is formed from a thermoplastic or thermoelastic vulcanizable material that is capable of bonding to the base layer 22 and to the reinforcing rod 12 during curing of the hose 10. Examples of typical materials for the base and cover layers 22, 28 include, but are not limited to, nitrile rubber for the base layer 22 and a nitrile rubber/PVC blend for the cover layer 28. The reinforcing rod 12 is formed from a material that is more rigid and/or has a higher mechanical strength than the cover layer 28, such as polyvinylchloride. The reinforcing rod 12 may also have an internal reinforcing wire.

The manufacture of the hose 10 is achieved by spirally winding the various hose layers 12, 22, 24, 26, 28, onto a mandrel 30, see FIG 3, to produce a hose length 32 which is then cut into short lengths to produce the inventive soft-cuff hose 10. More details concerning one method of manufacturing the hose length 32 are disclosed in US Patent 4,856,720, which is incorporated herein by reference. In this method of manufacturing, the hose length 32 is built upon a long, straight circular mandrel 30 that is fixed to rotating drives 34 at each end of the mandrel 30. The mandrel 30 is supported by roller bearings 36 at approximately every fifteen feet. Parallel to the mandrel 30 is a trolley 38 equipped with material applicators 40. The material applicators 40 are bobbins provided with the different materials 42 used in the manufacture of the hose length 32, including rubber, fabric, wire helix, PVC rod, curing tape, and rope.

The materials 42 used to construct the hose length 32 are applied spirally onto the rotating mandrel 30 as the trolley 38 moves parallel to the mandrel 30. The hose length 32 is constructed in this manner by applying one layer of material 42 over the proceeding layer.

Usually the trolley 38 will apply a layer in a first direction and the next layer in the opposite direction for symmetry and design purposes. For the illustrated hose length 32, the base rubber layer 22 is first applied to the rotating mandrel 30, followed by the reinforcing layers 24, 26, and then the cover layer 28. At this point in the construction of the hose length 32, a basic softwall rubber hose has been constructed on the mandrel.

To transform the softwall rubber hose length 32 into the helically reinforced, soft cuffed hose 10 of the present invention the following further steps are taken. At pre-selected regions 46 along the softwall rubber hose length 32, a material 44 is applied to render the pre-selected region non-adhesive to further layers applied to the hose length 32 in the pre-selected region. The pre-selected positions 46 along the hose length 32 are at locations corresponding to the lengths of the individual hoses 10 to be produced. For example, if twenty foot hoses 10 (including the cuffed ends) with six inch cuffs 20 at each terminal end are desired, a pre-selected non-adhesive region 46 is prepared along the hose length 32 for a length of twelve inches every nineteen feet. So for the entire mandrel length, the first six inches of the hose length 32 is rendered non-adhesive and then the trolley 38, applying a non-adhesive material 44, is moved nineteen feet further along the mandrel 30 from the position of the first non-adhesive region 46. The non-adhesive material 44 is then applied to the softwall rubber hose length 32 for a length of twelve inches to produce two six inch cuffs 20. The steps of moving the trolley 38 nineteen feet and applying twelve inches of non-adhesive material 44 is repeated along the length of the mandrel 30. The non-adhesive material 44 may be formed from any non-adhesive material that prohibits the outer rubber layer 28 from curing to the reinforcing rod 12. Such materials include, but are not limited to, nylon tape, film, or sheets, polyester tape, film or sheets, pre-cured rubber tape, film, or sheets, metallic film or sheets, Teflon film or sheets, or a liquid non-adhesion material.

After the non-adhesive material 44 is applied in the pre-selected positions, using the trolley 38, the reinforcing rod 12 is applied to the rotating mandrel 30 and onto the softwall rubber hose length 32. The reinforcing rod 12 is applied with a constant pitch except over the pre-selected region 46 where the non-adhesive material 44 has been applied, see FIG. 4. As the trolley 38 moves past the pre-selected regions 46 where the non-adhesive material 44 is applied, the speed at which the mandrel 30 rotates is reduced, while the trolley speed is maintained, thus increasing the pitch at which the rod 12 is applied to the mandrel 30. As illustrated, the hose length 32 on the mandrel 40 has a variably pitched reinforcing rod 12.

After the variably pitched reinforcing rod 12 has been applied, a rope 48 is inserted in the spaces formed between the windings of the rod 12. The rope 48 is applied in the same manner

as the reinforcing rod 12, with an increased pitch at the pre-selected areas 46 where a soft cuff 20 is to be formed on the finished hose 10. The diameter of the rope 48 is sized to maintain the desired pitching of the reinforcing rod 12 on the hose length 32. The rope 48 also acts as a mold to hold the hose layers 22, 24, 26, 28 and the rod 12 in place during the curing of the hose length 32. The rope 48 selected may be a conventional braided rope or a smooth rope; any conventional non-adhesive, flexible cord-type material may be used.

The hose length 32 is cured to vulcanize the layers 12, 22, 24, 26, 28 and create adhesion between the various layers 12, 22, 24, 26, 28, including between the reinforcing rod 12 and the hose cover layer 28. The rod 12 adheres to the cover layer 28 along the hose length 32, except where the non-adhesive material 44 has been applied. After the hose length 32 has been cured, the rope 48 is removed. After being removed from the mandrel 30, the hose length 32 is then cut into the desired final hose lengths. Preferably, the cuts are centered in the pre-selected regions 46 to produce two soft cuffs 20. The cuts may also be at one of the edges of the pre-selected region 46 if it is desired to form a hose 10 with only a single cuffed end 30. The portion of the reinforcing rod 12 that is not bonded to the outer cover layer 28 due to the presence of the non-adhesive material 44 is also removed. As a final step, if required, the non-adhesive material 44 is removed from the hose cuffs 20.

Due to the curing of the hose length 32 with the rope 48 being wound between the pitched helical windings of the reinforcing rod 12, and the tension force used to wind the rope 48 onto the mandrel 30, the flexible hose base 14 creates an indented imprint between the windings of the rod 12. The imprint from the rope 48 also extends into the soft cuff 20, creating a slight indent 50 in the soft cuff 30. The imprint indent 50 in the cuff 30 does not adversely affect the seal needed in applying a fitting to the hose cuff 30. If the rope 48 has a braided or textured pattern, then the indented imprint will be also have a braided or textured pattern.

As noted above, the hose 10 is manufactured by spirally winding the hose layers 12, 22, 24, 26, 28, onto a mandrel 30 to produce a hose length 32 which is then cut into short lengths with at least one soft cuffed end 30. The hose layers 12, 22, 24, 26, 28 may be applied to the mandrel 30 by means other than the illustrated traveling trolley 38 and material applicator 40. The layers 12, 22, 24, 26, 28 may be applied by moving a rotating mandrel 30 past a stationary material applicator 40. The layers 12, 22, 24, 26, 28 may also be applied by helically hand-winding the material 42 onto either a rotating or stationary mandrel 30.

Additionally, after the pre-selected region 46 has been modified to render that portion of the hose length 32 non-adhesive, the reinforcing rod 12 and supporting rope 48 may be applied by methods other than varying the pitch of the rod 12 and the rope 48. The reinforcing rod 12

may be applied at a constant pitch for the entire hose length 32, but with a reduced tension in the pre-selected non-adhesive regions 46. The rope 48, likewise, would then be applied at a constant pitch but with reduced tension in the pre-selected regions. The reduced tension of the rod 12 and rope 48 prevent the creation of multiple indents in the created soft cuff 20.

Since the inventive hose 10 has a terminal end 18 defined by a substantially constant inside and outside diameter for a defined length, it is easier to install any desired fittings to the cuffed hose end without the difficulties experienced with non-cuffed hoses and without needing to use known fitting aids as previously discussed.

CLAIMS

What is claimed is:

1. An improved flexible hose (10) comprising a flexible material (14) and a reinforcing rod (12) positioned externally of the flexible material (14), the flexible material (14) being formed with terminal ends (18), the improvement being characterized by:

the reinforcing rod (12) having at least one terminal end (16) being located short of the terminal ends (18) of the flexible material (14), the flexible material (14) thus becoming a soft cuff (20) adapted to be received by a hose fitting.

2. An improved flexible hose (10) in accordance with claim 1, wherein the hose (10) is further characterized by an imprinted indent (50) extending through the soft cuff (20).

3. An improved flexible hose (10) in accordance with claim 2, wherein the reinforcing rod (12) is wound at a pitch externally of the flexible material (14) and the indent (50) is wound at a pitch greater than the pitch of the reinforcing rod (12).

4. An improved method of manufacturing a hose (10) comprising

a) rotating a mandrel (30)

b) feeding a length of material (42) onto the mandrel (30) as the mandrel (30) rotates, to build a hose length (32) on the mandrel (30),

c) feeding a second length of material in the form of a reinforcing rod (12) onto the mandrel (30) as the mandrel (30) rotates to form a helical reinforcing rod (12) on the hose length (32), and

d) curing the hose length (32),

the improvement being characterized by:

prior to feeding the reinforcing rod (12) onto the mandrel (30), modifying the hose length (32) to create non-adhesive regions (46).

5. An improved method of manufacturing a hose (10) in accordance with claim 4, the method being further characterized by applying a third material (44) to the hose length (32) to create the non-adhesive regions (46).

6. An improved method of manufacturing a hose (10) in accordance with claim 4, the method being further characterized by cutting the hose length (32) in the non-adhesive

regions (46).

7. An improved method of manufacturing a hose (10) in accordance with claim 4, the method being further characterized by varying the speed at which the mandrel (30) rotates as the reinforcing rod (12) is feed onto the mandrel (30) at the non-adhesive regions (46).

8. An improved method of manufacturing a hose (10) in accordance with claim 4, the method being further characterized by reducing the winding tension of the reinforcing rod (12) as the reinforcing rod (12) is feed onto the mandrel (30) at the non-adhesive regions (46).

9. An improved flexible hose (10) made by any of the methods recited in claims 4-8.

10. A hose length (32) comprising at least one elastomeric layer (22 or 28) and a reinforcing rod (12) helically wound externally of the elastomeric layer (22), the improvement being characterized by:

non-adhesive regions (46) periodically spaced along the hose length (32).

11. A hose length (32) in accordance with claim 10, the hose length (32) being further characterized by the reinforcing rod (12) not being adhered to the at least one elastomeric layer (22 or 28) in the non-adhesive regions (46).

13. A hose length (32) in accordance with claim 10, the hose length (32) being further characterized by a rope (48) being wound adjacent to the reinforcing rod (12).

14. A hose length (32) in accordance with claim 10, the hose length being further characterized by the reinforcing rod (12) being wound at a greater pitch length in non-adhesive regions (46).

15. A hose length (32) in accordance with claim 10, the hose length being further characterized by the reinforcing rod (12) being wound at a lesser winding tension in the non-adhesive regions (46).

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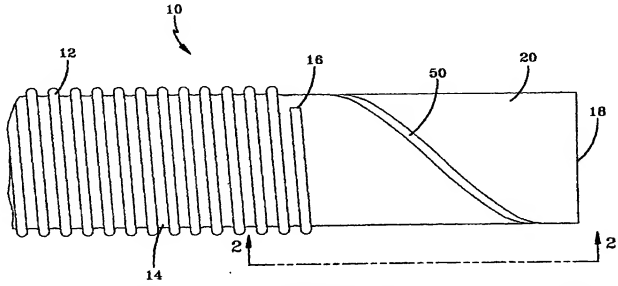
Published:

— *With international search report.*

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: CUFFED HOSE AND METHOD OF MANUFACTURE



(57) Abstract: The present invention is directed towards an improved flexible hose (10). The hose (10) is comprised of at least a flexible material (28) and a reinforcing rod (12) positioned externally of the flexible material (28). Terminal ends (16, 18) define both the flexible material (28) and the reinforcing rod (12). At least one terminal end (16) of the reinforcing rod (12) is located short of the terminal ends (18) of the flexible material (28), so that the non-reinforced end of the flexible material (28) forms a soft cuff (20) adapted to be received by a hose fitting. Also disclosed is an improved method of manufacturing the flexible hose (10).

WO 01/29474 A1

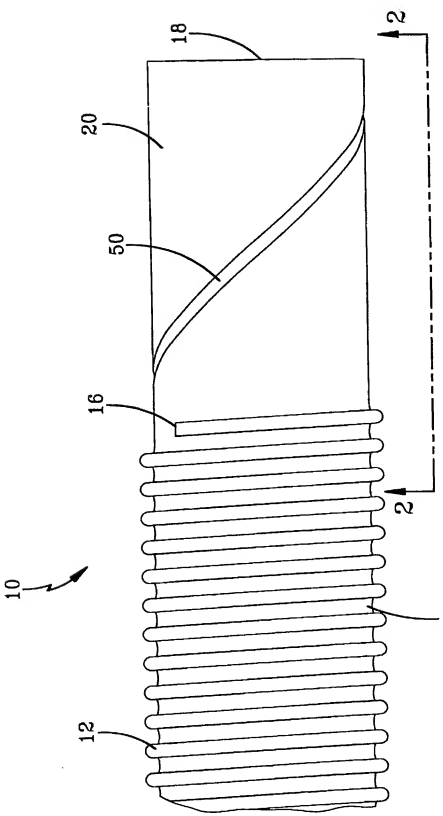


FIG-1

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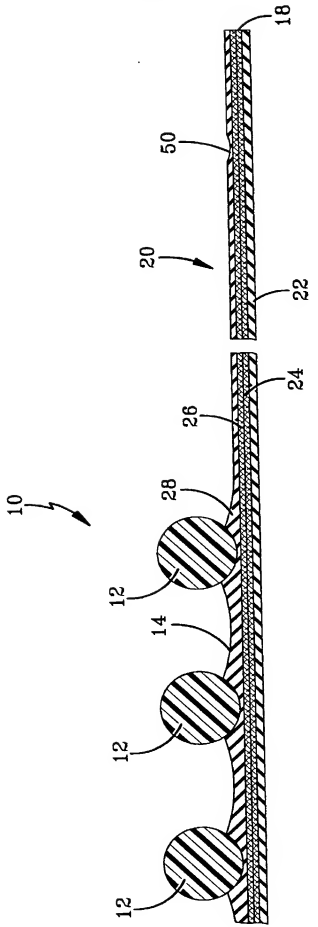

FIG-2

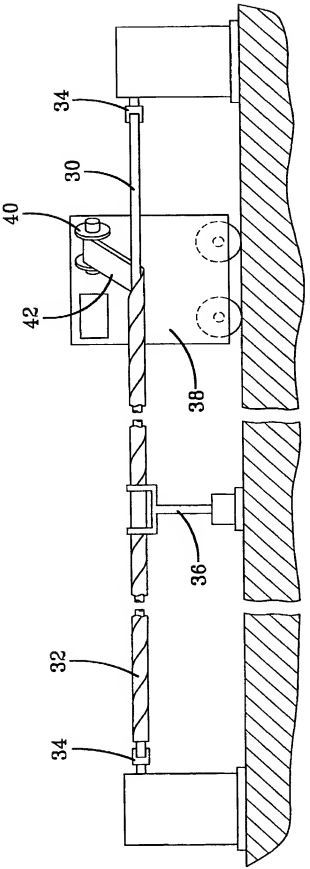

FIG-3

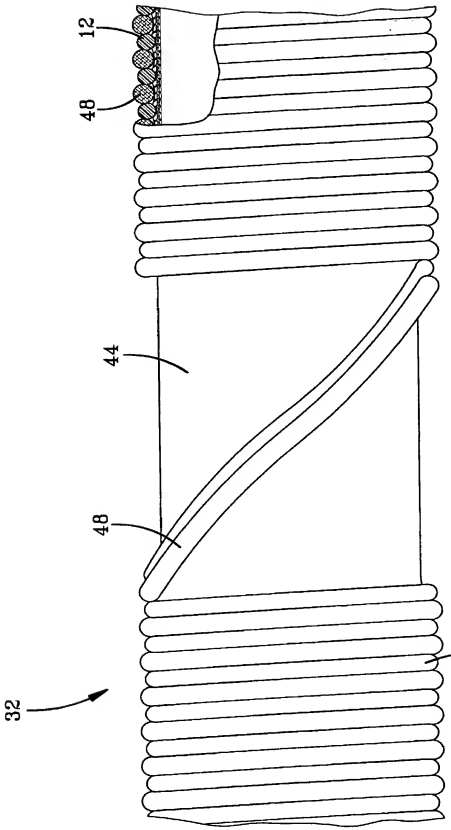

FIG-4

Docket No. DN1999227USA

DECLARATION AND POWER OF ATTORNEY

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled **CUFFED HOSE AND METHOD OF MANUFACTURE** the specification of which (check one)

____ a copy is attached hereto.

_X_ was filed on October 20, 1999 as Application Serial No. PCT/US99/24649

and was amended on _____ (if applicable).

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in 37 C.F.R. §1.56.

I hereby claim the benefit under 35 U.S.C. §119(e) of any United States provisional application(s) listed below:

(Application Serial No.) (Filing Date)

(Application Serial No.) (Filing Date)

I hereby claim the benefit under 35 U.S.C. §120 of any United States application(s) or §365 of any PCT International application designating the United States, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application in the manner provided by the first paragraph of 35 U.S.C. §112, I acknowledge the duty to disclose material information as defined in 37 C.F.R. §1.56 which become between the filing date of the prior application and the national or PCT international filing date of this application:

(Application Serial No.)	(Filing Date)	(Status)(patented, pending, abandoned)
(Application Serial No.)	(Filing Date)	(Status)(patented, pending, abandoned)

POWER OF ATTORNEY

As named inventor(s), I or we hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith.

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David L King	Registration No.	33,925

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under section 1001 of Title 18 of the United States Code, and that such willful false statement may jeopardize the validity of the application or any patent issuing thereon.

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